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EXAMINER
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**MAILED**  
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/000,208  
Filing Date: October 23, 2001  
Appellant(s): RANGARAJAN ET AL.

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Himanshu S. Amin  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 05/05/2005 appealing from the Office  
action mailed 12/07/2004.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

### **(8) Evidence Relied Upon**

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

6,371,667	Kitano et al.	04-2002
5,965,200	Tateyama et al.	10-1999
4,803,946	Ravishankar	02-1989
5,938,847	Akimoto et al.	08-1999
4,785,760	Tholome	11-1988

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1, 5, 6, 8, 9, and 11 - 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitano et al. (U.S. Patent No. 6,371,667) in view of Tateyama et al. (U.S. Patent No. 5,965,200) and Ravishankar (U.S. Patent No. 4,803,946).

Regarding Claims 1, 8, 9, and 13, Kitano et al. disclose a system comprising a reservoir (61) containing a resist solution (column 5, lines 24 - 32), and a nozzle (N1) in fluid communication with the reservoir; wherein the nozzle is movable between first and second positions, while being capable of continuously dispensing liquid; in the first position, the nozzle is positioned to dispense liquid from the reservoir onto a substrate; and in the second position the nozzle is positioned to dummy-dispense liquid from the reservoir into a return line to mitigate residual occlusion accrual in the nozzle (Figures

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24 – 27; column 9, line 66 - column 10, line 25). Kitano does not specifically speak to having the return line, which is considered to flow into a tank for storage, being in fluid communication with the reservoir (column 10, lines 47 -54), and does not disclose a liquid trap for mitigating evaporation. However, Tateyama et al. disclose immediately recycling the surplus coating material along with fresh coating material (Figure 2; column 5, line 65 - column 6, line 11), and Ravishankar discloses a draining system (Abstract) that would inherently mitigate fluid evaporation by exposing only a small volume of solvent in the exhaust system (Figure 4; column 3, lines 26 - 42) by using a p-trap in the drain or return line (column 4, lines 51 - 52). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to connect the return line or storage tank to the reservoir to streamline the process, increase efficiency, and use the resist coating solution as it is needed while operating the apparatus; and it would have been obvious to one of ordinary skill in the art to use a p-trap (a liquid trap) in the return line to minimize exposure of the resist solution (column 3, lines 31 - 34), thereby minimizing evaporation.

Regarding Claims 5 and 6, Kitano et al. disclose the nozzle to have a tip approximately in the shape of a truncated cone, wherein the tip has an orifice on the truncated end, and a circumference of the cone at its base that is considered to be at least about 10 times a circumference of the cone where it is truncated (Figure 4).

Regarding Claims 11 and 12, Kitano et al. disclose a pump that pumps fluid from the reservoir to the nozzle (column 5, lines 49 – 50), but do not disclose a fluid from the return line which is considered able to flow into the reservoir by the action of gravity.

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However, Tateyama et al. teach a fluid from the return line which is considered able to flow into the reservoir by the action of gravity (Figure 2; column 6, lines 3 – 11).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the action of gravity for the flow of the return line into the reservoir to minimize operational costs and avoid having to turn on and off a pump while changing substrates to be coated.

2. Claims 2, 3, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitano et al., Tateyama et al. and Ravishankar as applied in Claim 1 above, in view of Akimoto et al. (U.S. Patent No. 5,938,847).

Regarding Claim 2, Kitano et al., Tateyama et al. and Ravishankar disclose all the limitations of Claim 1, but do not disclose the return line to have a coupling with a shape complementary to that of the nozzle and the nozzle which is fit into the coupling when the nozzle is in the second position. However, Akimoto et al. disclose the return line to have a coupling with a shape complementary to that of the nozzle and the nozzle which is fit into the coupling when the nozzle is in the second position (Figure 2; column 8, lines 55 - 67 and column 10, lines 37 - 44). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have a coupling with a shape complementary to that of the nozzle since it is a conventional design, and also, in order to have a close fit with the nozzle and avoid any contamination of the coating material dispensed through the nozzle while in the second position.

Regarding Claim 3, Kitano et al. disclose the reservoir to be below the return line

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(Figures 4 and 25 - 27).

Regarding Claim 10, Kitano et al., Tateyama et al. and Ravishankar disclose a pump that pumps fluid from the reservoir to the nozzle (Kitano et al.: column 5, lines 24 - 32), but do not disclose the return line to be closed when the nozzle is in the first position. However, Akimoto et al. disclose the return line to be closed when the nozzle is in the first position (column 10, lines 45 - 54). Although the preferred embodiment discloses using a pump for the drain pipe, flow by action of gravity is not excluded. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to close the return line when the nozzle is in the first position to avoid contamination of the resist receptacle (51).

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitano et al., Tateyama et al. and Ravishankar as applied in Claim 1 above, in view of Tholome (U.S. Patent No. 4,785,760).

Kitano et al., Tateyama et al. and Ravishankar disclose all the limitations of Claim 1, but do not disclose the reservoir to have a port out which gas released from liquid in the reservoir is exhausted. However, Tholome discloses the reservoir to have a port out which gas released from liquid in the reservoir is exhausted (Figure 6; column 6, lines 36 - 52). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a reservoir with a port out wherein gas released from liquid in the reservoir is exhausted in order to facilitate tilling of the tank (column 6, lines 38-39).

**(10) Response to Argument**

As to the argument that the finality of the Office Action dated on December 7, 2004 being premature (see Appellants' Brief, pages 4-5 and 9), the examiner disagrees because referring to the amendment filed on 10/4/2004, examiner notes that there is a significant difference between the original claim 7 and the amended claims 1 and 13. Specifically, claim 7 refers to the return line including "a trap", while the amended claims 1 and 13 refer to "a liquid trap". As explained in the advisory action mailed 04/08/2005, a trap is a generic term that includes both liquid traps and non-liquid traps, such as filters. The amended claim narrowed the claim to only include liquid traps. Although the specification describes a liquid trap in the return line, the return line also includes a filter, which again, is considered to be a type of trap. Therefore, since the amendment to claims 1 and 13 called for a new search and necessitated a new ground of rejection, the finality of the Office Action mailed on 12/7/04 remains appropriate.

With respect to the argument presented by the Appellants regarding the feature "direct dispensing of resist liquid into the return line" or "dummy-dispensing liquid from the reservoir into the return line" (as clarified in the Appellants' Brief see page 6, 2<sup>nd</sup> paragraph), the liquid is not required to be directly dispensed from the reservoir into the return line according to claims 1 and 13; these claims do not exclude dispensing of liquid to a catch member. As such, direct dispensing of the liquid into the return line is not specifically required in claims 1 and 13. Additionally, Kitano et al as modified by Tateyama meet the claimed feature of dummy dispensing the liquid from the reservoir into the return line. As shown in Kitano et al (Figures 24 – 27; column 9, line 66 -



column 10, line 25), the liquid is dispensed *from the reservoir* (61) through the nozzle (N1) into a catch member (90) in the second position; furthermore Kitano et al teach reusing of a coating material (see Kitano et al, column 10, lines 47-54). In implementing a recycling system in Kitano et al device, the liquid material is then dispensed from the catch member *to a return line* (Tateyama et al show immediate recycling of coating material of processing apparatus having a return line, reservoir and others, see Fig. 2). Therefore, the requirement of the liquid to be dummy dispensed from the reservoir (passing through the nozzle and catch member) into the return line is met by Kitano et al as modified by Tateyama et al.

As to Appellants' argument that the catch member of Kitano et al's device is not in fluid communication with any storage means, Examiner disagrees. As explained above Kitano et al teaches the importance of reusing resist solution caught by the catch member to prevent wastage of coating material, and Tateyama shows (see Fig 2) immediate recycling of coating material to a reservoir (27) using a storage tank (60). One of ordinary skill in the art could look to some one like Tateyama et al. to see how one would design a recycling system that could be used in the apparatus disclosed by Kitano et al to efficiently use coating materials. Thus, Kitano et al. as modified by Tateyama et al. disclose a catch member in communication with a storage means.

With respect to the argument that Kitano et al teaches away from continuous resist flow (see Appellants' Brief, pages 6-7), examiner again disagrees. Firstly, Kitano et al. simply address the diameter of discharge port of the nozzles in relation to the kinds of resist solution supplied to the wafer when correlating the viscosity of the resist

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with the diameter of the nozzle. It is clear that the flow rate of resist solution flowing through the nozzle could vary depending the viscosity of the resist solution. However, Kitano et al's device is well capable of using the type of resist solution having a very low viscosity dispensed with a nozzle having smaller diameter discharge port; or a resist solution having high viscosity dispensed with a nozzle having larger diameter discharge port, in both cases to continuously run the resist solution through a nozzle discharge port. Although Kitano et al do not specifically disclose continuously dispensing fluid; the apparatus is capable of functioning as claimed.

Regarding the arguments presented by the Appellants as to Tateyama et al. reference, examiner disagrees. The specific structures (vacuum pumps, motor and aspirator (see Appellants' Brief, pages 7-8) of Tateyama et al's device is not pertinent. Tateyama et al. is cited because the apparatus shows how on in the art would introduce a recycling system to prevent wastage of coating material, as shown in the rejection above.

In response to appellants' argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning (see Appellants' Brief, page 10), it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170

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USPQ 209 (CCPA 1971). The Tateyama et al reference is used to show how one would add recycling to an apparatus such as the one disclosed by Kitano et al.

In response to appellants' argument with respect to claim 10 (see Appellants' Brief, page 11) that the references fail to show certain features of appellants' invention, it is noted that the features upon which appellants rely (i.e., a capping or return tube for returning recycled fast-drying resist to a reservoir when the nozzle is positioned to dispense resist onto a wafer) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Tateyama et al is cited for the teaching of recycling in Kitano et al and obviously Kitano et al does not disclose a vacuum to recapture fluid. Therefore Kitano et al, Tateyama et al., and Ravishankar would be able to function with a capped return line or reservoir.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Yewebdar Tadesse



Conferees:

Chris Fiorilla



Steve Griffin

